

Quantometer MZ

- ▶ **High accuracy budget meter**
- ▶ **Flow rate up to 10000 m³ /h**
- ▶ **Pressure range up to 100 bar**
- ▶ **Double Low Frequency transmitter and Anti-Tampering fitted as standard**
- ▶ **Various options available: transmitters, oil pump, version for aggressive gases, etc.**



▶ **Quantometer MZ DN150,**
Qmax: 1600 m³/h

MZ meters are flow meters. The flow of gas turns the turbine wheel, and thus the rotating speed of the turbine is proportional to the linear speed of the gas.

The movement is mechanically transmitted to the totaliser through a magnetic coupling.

Description

The MZ meter is composed of five 5 main parts:

- ▶ a body part containing all the components (1)
- ▶ a flow straightener to stabilise and accelerate the flow before the turbine wheel (2)
- ▶ a measuring unit including the turbine wheel (3)
- ▶ a magnetic coupling to transmit the movement of the turbine wheel to the totaliser (4)
- ▶ a totaliser to register the measured gas (5)

Applications

MZ meters are designed to measure natural gas, and various filtered, and non-corrosive gases.

They are used to measure low to medium and high flow, at low or medium, or high pressure.

They have been especially designed for industrial use and for secondary measurement

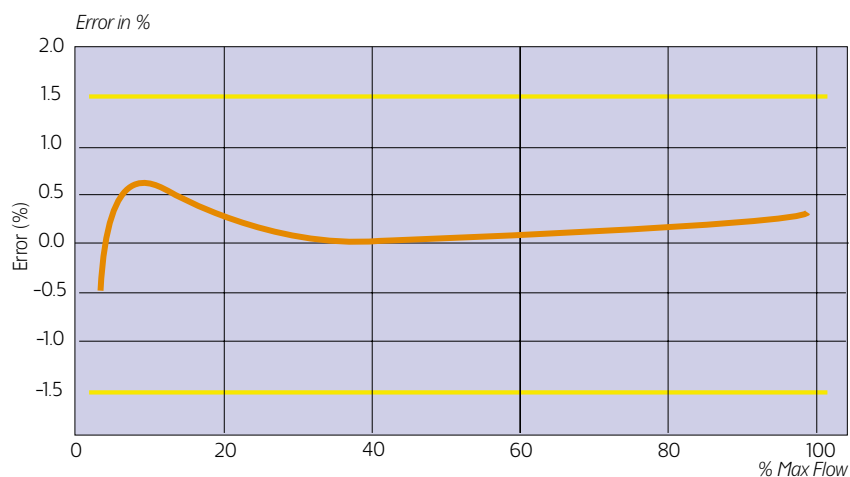
The possibility of fitting various options such as the oil pump or the PTFE coating version, means that they are also suitable for use in heavy duty measurement.



Features

Intrinsic safety approval	LCIE 02 ATEX 6255 X - Compliant with the Directive 94/9/EC
Flow rate	From 10 m ³ /h to 10000 m ³ /h
Nominal diameters	From DN 2" to 16", 50 to 400 mm
Material	Ductile iron, cast steel or welded steel. Compliant with the Pressure Equipment Directive 97/23/EC
Maximum working pressure	Up to 100 bar depending of the body material and flanging
Temperature range	Ambient: -20°C to +60°C Gas: -10°C to +60°C Storing temperature: -40°C to +70°C
Metrology	The tolerance of acceptance is +/-1.5% from Qmin to Qmax

Typical calibration curve



► Quantometer MZ DN 80,
Qmax: 400 m³/h

► Totaliser:

- 8-digit index
 - IP67 protection
 - UV resistant cover
 - Equipped with a built-in silicagel cartridge
 - Free-rotating totaliser
 - Fitted with a reflecting disc on the first drum
 - Integrated optical disc to facilitate the periodic calibration of the meter
 - Equipped with a magnet to allow the possibility of retrofitting to an external LF
- Unit: m³ or Cf³

► Transmitters

1-Low Frequency (LF):

2 Reed switches LF and anti-tampering (AT) are fitted as standard on the whole range

2- 1 inductive LF is supplied as an option

3-Medium Frequency (MF): a transmitter is supplied as an option

4- 1 external Reed switch can be retrofitted onto the meter

5-High Frequency (HF):

a transmitter is supplied as an option on the whole range, and it is fitted close to the turbine wheel

► Oil pump

6-An oil pump is supplied as an option.

It lubricates the ball bearings in the measuring unit.

The oiling can be done even when the meter is under pressure.

► Turbine wheel

7-This is the most important component of the meter for achieving high accuracy at low and high pressure. It can be made in aluminium for the whole range or in polyacetal for the DN \leq 200. Depending on the maximum flow rate, the blade of turbine wheel is oriented at 45° or 60°. Turbine wheel at 60° is used to avoid over-speed of the wheel.

When a HF is requested, the wheel must be in aluminium. For high pressure use, or for measuring dirty gases, an aluminium wheel is recommended.

► Pressure tapping:

This device allows the gas pressure to be measured at the reference point.

It is installed as standard.

► Measurement of aggressive gases:

A version with a PTFE (Teflon) coating, is available, as an option.

The coating is applied on the internal parts of the meter as well as on the body.



Characteristics

A) Technical data sheet Rangeability and pulse values

DN (mm)	Max Flow (m³/h)	Min Flow (m³/h)	Pressure loss ρ = 0.8 kg/m³	1 imp LF (m³/Imp)	1 imp MF (dm³/Imp)*	1 imp HF (dm³/Imp)*	Freq HF at Qmax (HZ)*
50	100	10	8.1	0.1	5.29655	0.00871	3188
80	160	10	2.0	1	22.85714	0.03760	1182
80	250	16	4.8	1	22.85714	0.03760	1847
80	400	25	11.0	1	39.72414	0.06535	1700
100	250	16	2.0	1	22.85714	0.06211	1118
100	400	25	4.8	1	22.85714	0.06211	1789
100	650	40	11.0	1	39.72414	0.10795	1673
150	650	40	1.5	1	22.85714	0.15238	1185
150	1000	65	4.3	1	22.85714	0.15238	1823
150	1600	100	9.0	1	39.72414	0.26483	1678
200	1000	65	1.5	10	228.5714	0.37303	745
200	1600	100	4.3	10	228.5714	0.37303	1191
200	2500	160	9.0	10	397.2414	0.64829	1071
250	1600	100	1.5	10	228.5714	0.57319	775
250	2500	160	4.3	10	228.5714	0.57319	1212
250	4000	250	9.0	10	397.2414	0.99617	1115
300	2500	160	1.5	10	218.9474	0.86064	807
300	4000	250	4.3	10	218.9474	0.86064	1291
300	6500	400	9.0	10	397.2414	1.56148	1156
400	4000	250	1.5	10	218.9474	2.05391	541
400	6500	400	4.3	10	218.9474	2.05391	879
400	10000	650	9.0	10	397.2414	3.72647	745

*With the correction gears 32/40 (correction 0%).

Body construction

DN (mm)	ISO PN 10	ISO PN 16	ISO PN 25	ISO PN 40	ISO PN 20 ANSI 150	ISO PN 50 ANSI 300	PN 110 ANSI 600
50	A	A	A	A	A	-	-
80	A	A	A	A	A	C	C
100	B	B	B	B	B	C	C
150	B	B	B	B	B	C	C
200	B	B	C	C	B	C	C
250	D	D	D	D	D	D	D
300	D	D	D	D	D	D	D
400	D	D	D	D	D	D	D

Note: for the pressure and temperature range of the body material, please check your National Rules.

B) Calculation of the extended rangeability

When the density of the measured gas increases, the minimum measured flow rate decreases.

This minimum flow rate in real conditions ($Q_{min_{RC}}$) can be evaluated using the following formula:

$Q_{min_{12}}$: minimum flowrate (m³/h) for a density of 1.2 kg/m³

ρ_{RC} : density of the gas in real conditions (kg/m³)

$$Q_{min_{RC}} = Q_{min_{12}} \times \sqrt{\frac{1.2}{\rho_{RC}}}$$

C) Pressure loss of the MZ meters Values: see table above

Calculation of pressure loss:
$$\Delta p = \Delta p_r \times \frac{\rho n}{0.83} \times (P_b + 1) \times \left[\frac{q}{Q_{max}} \right]^2 \times \left[\frac{273}{(273 + T_b)} \right]$$

- A: EN-GJS-400-15 (GGG40) Sandwich body
- B: EN-GJS-400-15 (GGG40) flanges body
- C: Steel Sandwich body
- D: Steel flanges body (cast or welded)

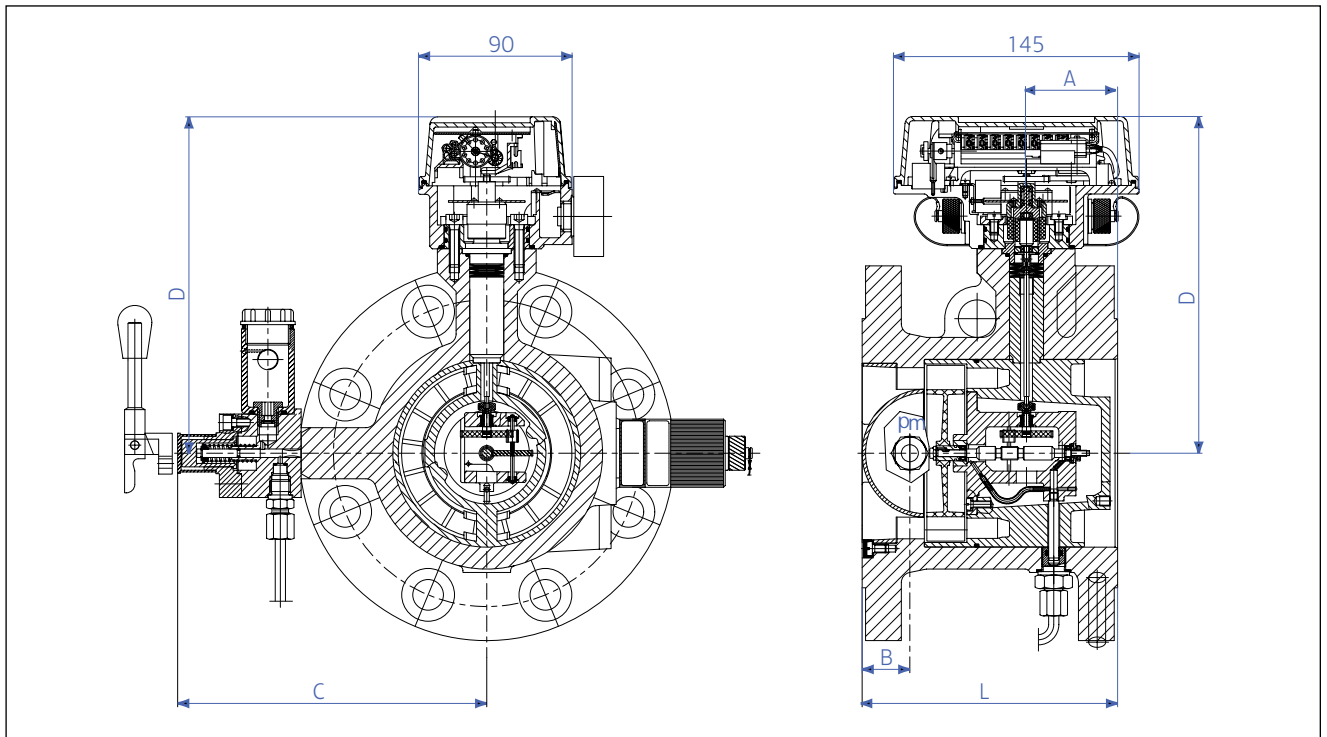
► Where:

- Δp: Pressure loss in the calculated conditions
- Δp_r: Pressure loss in the reference conditions
- ρn: Gas density (kg/m³) at 0°C and 1013 mbar
- P_b: Operating pressure (Bar gauge)
- q: Flow rate (m³/h)
- Q_{max}: Maximum flow rate (m³/h)
- T_b: Gas temperature (°C).

D) Dimensions and weights

Weights in kg

DN	ISO PN 10 - ISO PN 40	ISO PN 50 - ISO PN 110
	ANSI 150	ANSI 300 / ANSI 600
50	4	-
80	13	32
100	27	47
150	33	78
200	85	120
250	100	140
300	125	185
400	220	310



Dimensions in mm

DN	L	A	B	C		D
				ISO PN50 / ISO PN110 ANSI 150	ISO PN50 / ISO PN110 ANSI 300 / ANSI 600	
50	60	-	18,5	140	-	195
80	120	35	34	157	149	215
100	150	54	28	193	170	215
150	200	71	48	222	205	270
200	200	71	43	260	235	290
250	300	135	90	249	335	315
300	300	140	97	272	357	316
400	400	220	120	343	343	349

E) Transmitter characteristics

Intrinsic safety approval: N° LCIE 02 ATEX 6255X

Frequency pulse transmitter (LF):

The LF transmitter consists of 2 dry Reed switches, normally open, and controlled by a magnet situated in the first drum of the totaliser. The LF connections are without polarity.

Characteristics of LF transmitter:

- ▶ Intrinsic safety level:
⊕ II 1/2G EEx ia IIC T5
- ▶ Hermetically sealed contacts
- ▶ Maximum terminal voltage: 30 Volt and maximum current according to EN50020, as example:
 - 30 Volt - 101 mA
 - 24 Volt - 174 mA
 - 18,5 Volt - 402 mA
- ▶ Maximum temperature: +60°C
- ▶ Minimum pulse time: 0.4 sec

Anti-tampering transmitter (AT):

This consists of one dry Reed switch, normally closed. Attempts at magnetic tampering will open the contact. The electrical characteristics are the same as those for the LF transmitter.

F) Installation

Each meter is delivered with binder plugs for the installed transmitters and oil when an oil pump is installed.

Please refer to the instruction manual supplied with the meter.

The advice given therein will ensure optimal use of the MZ quantometer over the years.

Inductive transmitters (MF and HF):

They are inductive sensors actuated by a toothed disc. The frequency is proportional to the instantaneous flow. The polarity of the connections is indicated on the name plate of the meter.

Characteristics of transmitters:

- ▶ Intrinsic safety level:
⊕ II 1/2G EEx ia IIC T5
- ▶ Proximity detector conform to EN50227 (and NAMUR) standards
- ▶ They conform to CENELEC standards (EN50014 and 50020) with
 - $U_i \leq 15$ Volt
 - $I_i \leq 50$ mA
 - $P_i \leq 120$ mW
- ▶ Maximum temperature: + 60°C

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